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3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427				BALLINGER, MICHAEL ROBERT
ART UNIT		PAPER NUMBER		
		3732		
NOTIFICATION DATE		DELIVERY MODE		
02/19/2010		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/771,641	<b>Applicant(s)</b> RABY ET AL.
	<b>Examiner</b> Michael R. Ballinger	<b>Art Unit</b> 3732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 10/19/09.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-86 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-86 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

1. In acknowledgement of the communication filed 19 October 2009, claims 1-86 are currently pending.

***Claim Rejections - 35 USC § 101***

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-38, 75-80, and 82-86 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

4. Claims 1 is directed to a method including the steps of "displaying a digital representation of a tooth ... within a three-dimensional (3D) environment"; "displaying a two-dimensional planar guide within the (3D) environment"; and "rendering the planar guide". The claim as currently presented does not require the method to be implemented by a particular machine and does not require that the method particularly transform a particular article. As such claims 1-3, 5-38, 80, and 83-86 do qualify as eligible subject matter under 35 U.S.C. 101. Similarly claim 4 recites limitations including the steps of "displaying" and "rendering" but additionally includes "receiving input from the practitioner"; however, this limitation is also not tied to a particular machine and does not particularly transform a particular article and thus is not eligible subject matter. Claim 75 is directed to a computer readable medium; however, the claims and specification fail explicitly limit the computer readable medium to "non-transitory" tangible media. Because the broadest reasonable interpretation of this claim covers a signal *per se*, the claim stands rejected under 35 U.S.C. 101 as covering non-statutory subject matter. *See In re Nuijten*, 500 F.3d 1346, 1356-57 (Fed. Cir. 2007) (transitory embodiments are not directed

to statutory subject matter). The Examiner suggests amending claim 75 to add the limitation "non-transitory" to the claim to overcome the rejection of claims 75-79 and 82.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 5-11, 28, 30, 44-50, 64, and 78 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. It is unclear what if any relationship exists between the orientation of the planes of the appliance relative to the planes and orientation of the dental arch. In the remarks Applicant asserts "that the midsagittal plane is a plane of the orthodontic appliance, and, therefore, the orientation of the plane depends on the orientation of the orthodontic appliance." The Examiner notes, while the language of the claims is consistent with the language of the specification, the claims themselves do not clearly define the term "midsagittal plane". Applicant points to paragraph 0034 of the specification to clarify the inherent orientation of the planar guides. Paragraph 0034 states, "planes inherent to an orthodontic appliance will be parallel to their respective planes inherent to the anatomy of the tooth upon which the appliance is placed when practitioner 8 has placed or adjusted the appliance on the tooth in a manner deemed appropriate". While, the Examiner recognizes the midsagittal plane as claimed is "a plane of the orthodontic appliance" it is unclear what or how this plane is defined, as the term "sagittal" given its ordinary meaning is -of, relating to, situated in, or being the median plane of the body or any parallel plane to it. Additionally, Applicant states, "that a midsagittal plane of a bracket is parallel to the

longitudinal axis of the bracket" (see the instant specification paragraph 0045); however, the midsagittal plane 98 of figure 10 is seemly orthogonal to the longitudinal axis of the bracket. Furthermore, the claims recite "orthodontic appliance" which covers both brackets and archwires. The midsagittal plane of an archwire would certainly not be "parallel to the longitudinal axis" (where longitudinal means -running lengthwise). The claims also recite "mesial planar guide" and "distal planar guide" which in the realm of archwire raise additional issues with regard to clarity. The remarks and specification state "the mesial and distal planar guides visibly align with the mesial and distal edges of the bracket"; however, on an archwire two distal edges and no mesial edge would be present. With respect to the "occlusal-gingival axis" of claims 28 and 64, Applicant has argued "the occlusal-gingival axis is an axis of the orthodontic appliance, the axis changes orientation as the orthodontic appliance changes orientation". Again, it is unclear what kind of relationship, if any, exists between the orientation of the dental arch and the orientation of the occlusal-gingival axis. For example, is the occlusal-gingival axis of a lingual bracket the same as a labial bracket? While Applicant is entitled to be his or her own lexicographer, "In the absence of an express intent to impart a novel meaning to the claim terms, the words are presumed to take on the ordinary and customary meanings attributed to them by those of ordinary skill in the art." *Brookhill-Wilk I, LLC v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1298 67 USPQ2d 1132, 1136 (Fed. Cir. 2003). Thus, the Examiner maintains the use of the terms "midsagittal", "mesial", "distal", and "occlusal-gingival" are unclear and indefinite. The Examiner suggests amending the claims to more clearly define the "midsagittal plane of the orthodontic appliance" in terms of the inherent

structure of the appliance. For example, “wherein, the orthodontic appliance has a longitudinal axis and the midsagittal plane bisects the longitudinal axis”.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**9. Claims 1-13, 33-52, 69-74, and 80-81, 83-86 are rejected under 35 U.S.C. 102(b) as being anticipated by Taub et al. (U.S. 6,334,772).**

10. Per claim 1 and 39, Taub teaches a computing device (i.e., processor, 14) and a modeling software executing on the computing device for displaying a digital representation of a tooth (33) of a dental arch within a three-dimensional environment (i.e., camera + virtual view, figure 4C); while displaying the digital representation of the tooth (33) of the dental arch, displaying a two-dimensional planar guide (i.e., tooth, 33') within the 3D environment as a visual aid to a practitioner in a placement of an orthodontic appliance (i.e., bracket, 24) relative to the tooth of the dental arch (column 4, lines 48-51); wherein the two-dimensional planar guide is displayed separately from the digital representation of the tooth (column 7, lines 29-32); where displaying the planar (33') guide includes as the practitioner moves the orthodontic appliance relative to the tooth within the 3D environment, rendering the planar guide (33') at a position that is based on a position of the orthodontic appliance (24) within the 3D environment (column 7, lines 33-40).

11. Per claim 2 and 40 and 41, figures 4A-C of Taub teach a guide control module which controls the location of the planar guide and displays a planar guide (33') proximal to a position a

surface of the digital representation of the tooth (33). Per claim 3 and 42, the planar guide (33') of Taub is generated relative to a coordinate system associated with the orthodontic appliance (24). Per claim 5 and 44, figure 6 of Taub teaches the planar guide includes a mesial planar guide (i.e., right most line, 60), a distal planar guide (i.e., left most line, 60) parallel to a midsagittal plane (i.e., line, 68) of the orthodontic appliance (69). Per claim 6 and 45, figure 6 of Taub teaches the mesial and distal planar guides (60) are equidistant from the midsagittal plane (68). Per claim 7 and 46, figure 6 of Taub teaches rendering an occlusal planar guide (i.e., line, 62) parallel to a midlateral plane (i.e., line 66) of the orthodontic appliance (69) proximate an occlusal surface of the tooth (see figures 7A and 7B). Per claim 8, 10, 47 and 49, figures 6 and 7A-B of Taub teaches displaying the midlateral planar guide (66) and a midsagittal planar guide (68). Per claims 9 and 48, Taub teaches a midfrontal planar guide (i.e., the area between lines 60 and 62). Per claims 11 and 50, figure 4C of Taub teaches a gingival planar guide (i.e., top line of 33') proximate the gingival edge of the tooth (i.e., top edge of tooth 33). Per claims 12-13 and 51-52, figure 4C of Taub teaches displaying the planar guide as semi-transparent including at least two lines. Per claims 33-36 and 69-72, Taub teaches displaying a visual reference relative to the planar guide (i.e., target, column 2, lines 52-56), displaying a rectilinear grid (see figure 4C), displaying a cross-hair (i.e., X or +, column 2, lines 52-56). Per claims 37 and 73, each dash of the lines shown in figure 4C of Taub has been construed by the Examiner as a contour line indicating a constant distance. Per claims 38 and 74, the orthodontic appliance of Taub is a bracket (24). Per claims 80 and 81, Taub teaches computing an orientation of the planar guide based on the placement of the orthodontic appliance within the 3D environment (column 3, lines 1-16). Per claims 83 and 84, figures 5A and 5B of Taub teach displaying a second two-

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dimensional planar guide lying in a different plane (i.e., either of the tracing of the adjacent teeth) and automatically moving the second planar guide. Per claim 85 and 86, figure 5A shows the occlusal planar guide penetrating the occlusal surface of the tooth and a distal planar guide penetrating a distal edge of the tooth.

12. Per claims 4 and 43, Taub teaches displaying a digital representation of a tooth (33) of a dental arch within a three-dimensional environment (i.e., camera + virtual view, figure 4C); positioning an orthodontic appliance (i.e., bracket, 24) within the 3D environment in response to input from a practitioner (i.e., proper position information, 16), while displaying the digital representation of the tooth (33) of the dental arch, displaying a two-dimensional planar guide (i.e., tooth, 33') within the 3D environment as a visual aid to a practitioner in a placement of an orthodontic appliance (i.e., bracket, 24) relative to the tooth of the dental arch (column 4, lines 48-51); wherein the two-dimensional planar guide is displayed separately from the digital representation of the tooth (column 7, lines 29-32); where displaying the planar guide (33') includes rendering the planar guide (33') at a position that is based on a position of the orthodontic appliance (24) within the 3D environment (column 7, lines 33-40), receiving input from the practitioner moving the placement of the orthodontic appliance with respect to the tooth within the 3D environment (column 6, lines 55-65), and automatically moving the planar guide (33') within the 3D environment as the practitioner moves the orthodontic appliance (column 3, lines 13-17).

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

15. **Claims 14-28, 31-32, 53-64, 67-68, 75-78, and 82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taub et al. (U.S. 6,334,772).**

16. Per claims 14-17, Taub fails to explicitly teach changing the color or transparency of the planar guides. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Taub to allow for such variations as such modifications are matters of design choice well within the level of skill of ordinary artisans.

17. Per claims 18-19 and 53-55, it would have been obvious to one having ordinary skill in the art to store data that describes attributes of different types of orthodontic appliances and control the planar guides based on the stored data in order to minimize the amount of information that must be manually entered by the practitioner. Per claims 20-25 and 56-61, the Examiner notes Taub teaches displaying different types of planar guide data (column 2, lines 44-56) but fails to teach storing this data. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method and device to allow for the storing of planar guide data to allow the practitioner the option of displaying only the

information most relevant to a particular placement task. Per claims 26-28 and 62-64, the Examiner notes, Taub fails to explicitly teach scaling and shearing the planar guides based on the dimensions of the tooth. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method and system of Taub to allow for scaling and shearing in order to compensate for changes in the image capturing device (i.e., wide angle or narrow angle cameras). Per claims 31-32 and 67-68, the Examiner notes, Taub fails to explicitly teach storing statistical normal distances for the dimensions of the teeth. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to store and utilize statically normal teeth sizes in order to allow the device to minimize the amount of information that must be manual entered into the system.

18. With regards to claims 75-78 and 82, the Examiner notes, Taub discloses the steps and instructions as substantially claimed as detailed above but fails to explicitly teach that the instructions are stored on a computer readable medium which work in concert with the system. However, Taub does disclose the method is carried out via software (column 3, lines 40-51). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device as taught by Taub to include storage for the instructions on computer readable medium executing on the processor in order to allow for changes to be made to the protocol and better portability of the device.

19. **Claims 29-30, 65-66, and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taub et al. (U.S. 6,334,772) in view of Kopelman et al. (U.S. 2003/014509).**

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Per claims 29-30 and 65-66 and 79, Taub disclose a method and system that shows the limitations as described above; but fails to teach data of rules for orthodontic appliance. Kopelman et al. teach a method and system comprising data 110 of rules for applying the orthodontic appliance. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method and system to comprise data of rules in order to obtain a desired outcome of positioning and orientation in view of Kopelman et al.

*Response to Amendment*

20. The declaration under 37 CFR 1.132 filed 19 October 2009 is sufficient to overcome the rejection of claims 38 and 74 based upon 35 U.S.C. 112, first paragraph.

*Response to Arguments*

21. Applicant's arguments, see pages 4-8 of the remarks, filed 19 October 2009, with respect to 35 U.S.C. 112, first paragraph rejection have been fully considered and are persuasive. The rejection of claims 38 and 74 has been withdrawn.

22. Applicant's arguments filed 19 October 2009 with respect to the 35 U.S.C. 112, second paragraph rejection of claims 5-11, 28, 30, 44-50, 64, 66, and 78 have been fully considered but they are not persuasive. The Examiner believes the discussion in the 35 U.S.C. 112 section above has addressed Applicant's arguments on this issue.

23. Applicant's arguments, see page 11-16 of the remarks, filed 19 October 2009, with respect to the rejection(s) of claim(s) 1-86 under 35 U.S.C. 102(b) and 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Taub et al. and Kopelman et al.

***Conclusion***

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael R. Ballinger whose telephone number is (571)270-5567. The examiner can normally be reached on Monday thru Friday 8:00 AM to 5:00 PM.
25. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cris L. Rodriguez can be reached on (571)272-4964. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.
26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael R Ballinger/  
Examiner, Art Unit 3732

/Cris L. Rodriguez/  
Supervisory Patent Examiner, Art Unit 3732